



[JP,06-246781,A] : 特許庁の特許電子図書館より抜粋

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Industrial Application] This invention relates to the shaping equipment used for operation of the shaping approach which fabricates the half-hollow object of a pair by primary shaping, joins the joint with secondary shaping and fabricates a hollow object product, and the shaping approach.

[0002]

[Description of the Prior Art] As the manufacture approach of the hollow object product of synthetic-resin nature, the manufacturing method by the blow molding machine and the manufacturing method by the injection molding machine are known. When manufacturing a hollow object product with an injection molding machine, in primary formation, a hollow object product is formed as the half-hollow object or division object of 2 rates, the part which compared the parting plane in secondary formation, and compared is heated or welded, and one hollow object product is manufactured. Although there was also an advantage of a uniform thick hollow object product also being made, and also being able to cope with a complicated configuration while being able to make the hollow object product sealed completely according to the manufacturing method using this injection molding machine, these people offered the manufacture approach of the hollow object product which improved the above-mentioned manufacture approach further and fitted mass production by JP,62-87315,A. The metal mold of a lot is used for operation of this approach. The male and female mold for forming the method of one of a division object in metal mold of one of these are prepared, and the female mold and male for forming another side of a division object in the metal mold of another side are formed. The division object of a pair is formed using 1 set of these metal mold, and melting resin is injected to the periphery of the abutting surface after comparing the plane of composition of these division objects, it unites with it, and a hollow object product is obtained.

[0003] By the way, the application of plastics is expanded in recent years, and the property is employed efficiently, for example, a part of an internal combustion engine's intake manifold is fabricated from plastics. a \*\* alligator -- when explained in detail, the intake manifold of an automobile was for leading the gaseous mixture for combustion to an engine cylinder from carbureter, since the duct had branched like a branch, was also called the inhalation manifold, and was really conventionally formed from the casting. However, since weight is large, a body weight increases and fuel consumption worsens, a casting comes to be formed from aluminum or its alloy, and recently forms a body part from aluminum, and the covering is increasingly fabricated from still more nearly lightweight plastics. Thus, in the periphery section, the intake manifold fabricated considering aluminum or the body part made from the alloy, and the covering part of plastics nature as a division object intervenes, binds an O ring tight with a bolt nut, and is unified.

[0004]

[Problem(s) to be Solved by the Invention] According to the above-mentioned approach, there is an advantage that each process can be automated and a hollow object product can be mass-produced since a hollow object product can be obtained by injecting melting resin, by sliding or rotating one metal mold to the metal mold of another side, and comparing the division object of a pair. Moreover, since the division object of a pair is fabricated by injection formation, it also has the description of also being able to manufacture the hollow object product of a complicated configuration. Thus, the point which should be improved was found out although it was about many advantages. That is, according to the above-mentioned approach, there is a problem that the division object of a pair of the reinforcement of the joint of the obtained hollow object product is weak since the joint has joined to the part compared and compared by injecting melting resin. Reinforcement of a joint can be enlarged to some extent by enlarging injection pressure when injecting melting resin at the time of secondary shaping, and raising the adhesion of the joint of a division object, and the resin injected with secondary shaping. Moreover, welding nature can be increased by injecting the resin same at the time of secondary shaping as a division object. However, in order to enlarge injection pressure, when metal mold for secondary shaping etc. must be made firm and injection pressure is enlarged, it is also possible that a division object deforms. When it is made to inject the same resin, it becomes moreover, less inflexible to selection of resin. It cannot be said that the shaping approach of the conventional hollow object product is suitable at the above order as the manufacture approach of an Onaka mold tank, for example like a kerosene tank that the reinforcement of a joint is required comparatively.

[0005] Moreover, as mentioned above, when an O ring is intervened and the body part made from aluminum and the covering part of plastics nature are bound tight with a bolt nut, there is a fault in which a manufacturing cost, assembly expense, etc. increase. Although an O ring will be unnecessary, assembly will also become easy and a cost cut will be possible instead of binding tight with a bolt nut if it joins with the application of the shaping approach of the

conventional hollow object product, the lack of on the strength of a joint is not escaped. This invention is proposed that a trouble which was described above should be improved, and although the reinforcement of a joint is large and does not specifically limit, it aims at offering the shaping approach suitable for manufacture of the hollow object product with which the tank of the Onaka mold and the reinforcement of a joint like an intake manifold are demanded, and its shaping equipment.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention according to claim 1 In the approach of fabricating the half-hollow object of a pair by primary shaping so that it may have a joint, and joining the joint with secondary shaping and fabricating a hollow object product In primary shaping, from the restoration slot which carried out opening to the junction edge side at the joint of the half-hollow object of a pair, and the exterior, fabricate two or more free passage holes which were open for free passage into said restoration slot, and the edge of said joint in the condition of having made it contacting mutually, in secondary shaping Melting resin is injected into two or more of said free passage holes and restoration slots, and it is constituted so that a hollow object product may be obtained. When invention according to claim 2 injects melting resin into two or more free passage holes and restoration slots in secondary shaping according to claim 1, It is constituted so that an exit hole may be made to correspond to the free passage hole of one half-hollow object of the half-hollow objects of a pair and it may inject. And invention according to claim 3 In secondary shaping according to claim 1 or 2, when injecting melting resin into two or more free passage holes and restoration slots, it is constituted so that the larger heights or the larger protruding line of this free passage hole than a path may be fabricated on the outside of a free passage hole. While the restoration slot is formed over the perimeter of the joint, shaping equipment according to claim 4 It is shaping equipment for joining the half-hollow object of a pair with which two or more free passage holes which were open for free passage into said restoration slot from the outside of said joint are fabricated. This equipment It consists of the 1st holder holding one half-hollow object A, and the 2nd holder holding the half-hollow object of another side. Said the 1st and 2 holder While holding the joint of said half-hollow object, the resin feed hopper for injecting melting resin is formed in a free passage hole and a restoration slot, and it is in one [ at least ] holder of said holder. While the resin feed hopper in which invention according to claim 6 is formed in according to claim 4 or 5 one holder, and the resin feed hopper of according to claim 5 invention according to claim 4 is so that it may correspond to the number and location of a free passage hole supports the number and location of a free passage hole by \*\* in the shape of a bowl, it is constituted so that the attaching part of the holder of another side may also correspond to the number and location of a free passage hole by \*\* in the shape of a bowl.

[0007]

[Function] Invention according to claim 4 acts as follows. That is, while the restoration slot is

formed over the perimeter of a joint, the half-hollow object of a pair with which two or more free passage holes which were open for free passage into the restoration slot from the outside of a joint are fabricated is prepared. And the joint of one half-hollow object is held with the 1st holder, the joint of the half-hollow object of another side is held with the 2nd holder, and it maintains at the condition of having made the edge of a joint contacting. Since the resin feed hopper is formed in one [ at least ] holder of the 1st and 2 holder, melting resin is injected into two or more free passage holes and restoration slots from this resin feed hopper, and a half-hollow object is unified. The hollow object product unified by waiting for cooling solidification of melting resin is taken out. Since the resin feed hopper supports the number and location of a free passage hole of a half-hollow object, invention according to claim 5 is held so that a resin feed hopper may be in agreement with the number and location of a free passage hole of a half-hollow object, when holding the joint of the half-hollow object of a pair with the 1st and 2 holder. Then, melting resin is injected from a resin feed hopper. If it does so, two or more free passage holes and restoration slots which are formed in the half-hollow object of a pair will be filled up with melting resin. The hollow object product unified by waiting for solidification of melting resin is taken out. Since the attaching part of the holder of another side is also by \*\* in the shape of a bowl corresponding to the number and location of a free passage hole while the resin feed hopper which is formed in one holder and is while acting like invention of claim 4 and five publications corresponds and is in the number and location of a free passage hole by \*\* in the shape of a bowl, invention according to claim 6 is injected so that these hollows may also be filled up with resin.

[0008]

[Example] Hereafter, the example of this invention is explained. In this example, a hollow object product is manufactured from synthetic resin by primary shaping and secondary shaping. That is, this example consists of a primary shaping approach which fabricates the half-hollow object or division object of a pair of 2 rates with each metal mold, a secondary shaping approach of injecting melting resin to the joint of the division object acquired by this primary fabricating method, and obtaining a hollow object product, and shaping equipment with which this secondary shaping is presented. Since the approach and metal mold of that the metal mold used for the primary shaping approach which forms the division object of a pair, and operation of the approach is conventionally well-known, or common knowledge are applicable, it is not shown in drawing and explanation is not given, either. Although it does not need to be fabricated by the symmetry form, the division object, i.e., the half-hollow object, of a pair acquired with primary shaping, it explains drawing 1 and the example currently fabricated by the symmetry form about 2, 5, and 6.

[0009] The class of resin injected with the class of resin of the half-hollow object of a pair and secondary shaping is not limited exceptionally. For example, the half-hollow object of a pair is fabricated with the polyphenylene ape fight PPS, and Polyamide PA, nylon PA 6, the polyphenylene ape fight PPS, Polycarbonate PC, polybutylene terephthalate PBT, etc. can be

applied to secondary shaping. If the resin of the same class as primary shaping and secondary shaping is applied, even if the half-hollow object of a pair and the concordance of the resin injected at the time of secondary shaping are good and inject with low temperature and low voltage, the welding nature of a joint will improve. Moreover, since the class of resin is the same, there is also an advantage [ RISAIRU / advantage / fuses as it is and ].

[0010] One half-hollow object A is equipped with body section 1A of the shape of half-hollow or a bowl as shown in (b) of drawing 1 , and (b). This body section 1A consists of circular pars-basilaris-ossis-occipitalis 2A and tubed drum section 3A, and ring-like connection 10A is fabricated in one by the periphery section of open end section 4A of drum section 3A. Connection 10A has predetermined thickness in the same shaft orientations as drum section 3A. And slot 11A of the predetermined depth is formed in the direction of open end section 4A to pars-basilaris-ossis-occipitalis 2A over the perimeter at this connection 10A. such -- as a result of forming what slot 11A, the contact sections 12A and 13A are formed in the bore [ of slot 11A ], and outer-diameter side in concentric circle, respectively. Moreover, in connection 10A, two or more bores 14A and 14A which are open for free passage from the outside to slot 11A, and -- have ended in parallel with drum section 3A. Since the half-hollow object B of another side is formed in the same configuration as the above-mentioned half-hollow object A according to this example, "B" is attached to the same reference figure in drawing 2 , and duplication explanation is not given.

[0011] The shaping equipment 20 used for secondary shaping consists of the 1st holder 21 and the 2nd holder 30 as shown in drawing 3 . The 1st holder 21 holds joint 10B of the half-hollow object B shown in drawing 2 mentioned above at the time of secondary shaping, and the 2nd holder 30 holds joint 10A of the half-hollow object A. The 1st holder 21 is equipped with joint 10B of the half-hollow object B, and the cylinder part 22 of approximately the same diameter. And two or more crevices 28 and 28 and -- which became depressed in the shape of a bowl as shown also in (b) of drawing 4 are prepared in the receptacle section 23 at the tip of this cylinder part 22. These crevices 28 and 28 and the path in the open end section of -- are larger than Bores 14B and 14B and the path of --. And exit holes 24 and 24 and -- have attended crevices 28 and 28 and the pars basilaris ossis occipitalis of --. Thus, crevices 28 and 28 and the heights of -- which made the configuration of the head of a rivet the outside of joint 10B when melting resin was injected from these exit holes 24 and 24 and -- so that it might mention later since exit holes 24 and 24 and -- had attended the pars basilaris ossis occipitalis will be fabricated. Crevices 28 and 28, -- 24 and 24, i.e., exit holes, and-- are open for free passage on the resin supply way 26 through the resin branching paths 25 and 25 and -- in accordance with the number and location of Bores 14B and 14B and -- which have broken in joint 10B of the half-hollow object B. In addition, the sign 27 in drawing 3 shows the nozzle of a catapult.

[0012] The 2nd holder 30 as well as the 1st holder 21 is equipped with joint 10A of the half-hollow object A, and the cylinder part 31 of approximately the same diameter. And two or

more crevices 33 and 33 and -- which became depressed in the shape of a bowl are formed in the press section 32 at the tip of this cylinder part 31. And it is in agreement with the number and location of Bores 14A and 14A and -- where these crevices 33 and 33 and -- have also ended in joint 10A of the half-hollow object A. Crevices 33 and 33 and the arrangement condition of -- are shown in (b) of drawing 4. In addition, it is not shown in drawing, the device, for example, the oil pressure piston cylinder, which binds the 1st and 2 holders 21 and 30 tight at the time of secondary shaping.

[0013] Next, the example of secondary shaping is explained. As the contact sections 12A, 13A, 12B, and 13B of the half-hollow objects A and B contact mutually, they receive the outside of connection 10B of the half-hollow object B in the receptacle section 23 of the 1st holder 21, as shown in drawing 2. And the outside of connection 10A of the half-hollow object A is pushed in the press section 32 of the 2nd holder 30 using an oil pressure piston cylinder etc. If it does so, it will be in a mold clamp condition. At this time, the exit holes 24 and 24 of the 1st holder 21, --, the crevices 33 and 33 of the bores 14B and 14B of the half-hollow objects B and A, --14A, 14A, --, the press section 32 section of the 2nd holder 30, and -- are adjusted mutually. Subsequently, melting resin is injected from the nozzle 27 of a catapult. If it does so, the bores 14B and 14B of the half-hollow object B, --, the space currently formed in the slots 11B and 11A of the half-hollow objects B and A and the bores 14A and 14A of the half-hollow object A, and -- will be filled up with melting resin from exit holes 24 and 24 and -- through the resin branching paths 25 and 25 and -- from the resin supply way 26. At this time, crevices 28 and 28, --, 33 and 33, and -- are also filled up. The condition that injection restoration finished is shown by J, J, and J in drawing 5. It waits for cooling solidification, the 2nd holder 30 is moved in the direction of an arrow head in drawing 6, and a product is taken out.

[0014] According to this example, various effectiveness is acquired. For example, since the crevices 28 and 28 and -- which have become depressed in the shape of a bowl are faced two or more exit holes 24 and 24 established in the receptacle section 23, and --, Heights RB and RB and -- which carried out the bores 14B and 14B of the half-hollow object B and the configuration of the head of a rivet as shown outside at drawing 6 of -- are fabricated. The bores 14A and 14A of the half-hollow object A, the heights RA and RA of -- which carried out the configuration of the head of a rivet also outside, and -- are fabricated similarly. Therefore, even if the big force of estranging to shaft orientations acts on the half-hollow objects A and B, RB, RB, and -- can receive and it does not have the force Heights RA and RA, --, that the half-hollow objects A and B dissociate. In addition, although not shown in drawing, it can also carry out so that Heights RA and RA, --, RB and RB, and -- may not be fabricated. That is, use of crevices 28 and 33 and the 1st and 2 holders 21 and 30 without -- does not fabricate Heights RA and RA, --, RB and RB, and --. Since Bores 14B and 14B, --, 14A and 14A, and -- are filled up with resin even if these heights do not exist, welding distance or area is large as compared with the conventional thing. Therefore, the large hollow object product of the junction force can be obtained. Moreover, according to this example, since the exit holes 24 and 24 of the 1st

holder 21, --, the crevices 33 and 33 of the bores 14A and 14A of the half-hollow objects A and B, --14B, 14B, --, the press section 32 section of the 2nd holder 30, and -- are adjusted mutually, they can be injected with comparatively low injection pressure. Furthermore, since the 1st and 2 holders 21 and 30 hold only the connections 10A and 10B of the half-hollow objects A and B, they are effective in the structure of shaping equipment becoming easy as compared with the conventional metal mold.

[0015] Next, drawing 7 and 8 explain other examples of shaping equipment 20'. In addition, a dash "" is attached to the same reference figure as the same member as drawing 3 and the example which is shown in 4 and is, and duplication explanation is not given. this example -- depending -- if -- drawing 7 -- (b) -- (b) -- being shown -- having -- \*\*\*\* -- as -- the -- one -- a holder -- 21 -- ' -- a cylinder part -- 22 -- ' -- a tip -- a receptacle -- the section -- 23 -- ' -- \*\*\*\* -- the -- the perimeter -- crossing -- a cross section -- a bowl -- \*\* -- having become depressed -- a ring -- \*\* -- a slot -- 40 -- preparing -- having -- \*\*\*\* . And two or more exit holes 41 and 41 are carrying out opening to this slot 40. Exit holes 41 and 41 are established in the location of arbitration, and have not considered adjustment as the bores 14A and 14A of the half-hollow objects A and B, --14B, 14B, and --. the -- two -- a holder -- 30 -- ' -- a cylinder part -- 31 -- ' -- a tip -- press -- the section -- 32 -- ' -- \*\*\*\* -- drawing 8 -- (b) -- (b) -- being shown -- having -- \*\*\*\* -- as -- a bowl -- \*\* -- having become depressed -- a ring -- \*\* -- a slot -- 50 -- forming -- having -- \*\*\*\* .

[0016] Therefore, if the outside of connection 10B of the half-hollow object B is received by receptacle section 23 of 1st holder 21" and melting resin is injected in the press section 32 of 2nd holder 30' from connection 10A push and the exit holes 41 and 41 of the half-hollow object A The space currently formed in the slots 11A and 11B of the half-hollow objects A and B through the bores 14B and 14B of the half-hollow object B and -- from the ring-like slot 40 and the bores 14A and 14A of the half-hollow object A, and -- are filled up with melting resin. And the slot 50 of the shape of a ring of press section 32' is also filled up. Therefore, the bores 14B and 14B of the half-hollow object B, and the outside and the bores 14A and 14A of the half-hollow object A, the heights RA and RB of -- that the protruding line was fabricated outside at the perimeter and mentioned above and the same effectiveness as -- of -- are acquired.

[0017] According to this example, although the surroundings of melting resin are not good, structures, such as resin branching path 25 of 1st holder 21" and 25', become easy, and the alignment of 1st and 2 holder 21', 30', and the half-hollow objects A and B becomes easy. Using it combining the 1st holder 21 shown in drawing 3 and 2nd holder 30' shown in drawing 8 can also be used combining the 2nd holder 30 conversely indicated to be this to drawing 3 , and 1st holder 21' shown in drawing 7 so that clearly also from the above-mentioned explanation.

[0018] Although the half-hollow objects A and B fabricated by primary shaping can also be carried out in various forms, the typical example of other is shown in drawing 9 . Although a dash "" is attached to the same reference figure as the same member as the example

mentioned above also in this example and duplication explanation is not given, as for slot 11A' and 11B', the side cross-section form is formed in the ant form in the example shown in (b) of drawing 9 . Half-hollow object A' and B' seem therefore, not to dissociate, unless the resin injected with secondary shaping considers compression or elongation deformation as half-hollow object A' and B', even if the hauling force in which half-hollow object A' and the adhesion condition of B' and the resin injected with secondary shaping are bad, and big in the direction estranged to a joint acts. In the example shown in (b), the periphery side of slot 11A' and 11B' is cut off. Therefore, although the holder with which one [ at least ] holder of the 1st holder 21 or the 2nd holder 30 is shown in drawing 3 , and 4, 7 and 8 is inapplicable, the effectiveness that it can inject from a circumferencial direction using a suitable holder is acquired. Moreover, slot 11B' is formed in the half-hollow object B in the example shown to (Ha) of drawing 9 . This example is convenient, when the configurations of B' differ and half-hollow object A' and B' cannot be fabricated with the same metal mold, half-hollow object A' and. In the example shown in (d), bore 14A', 14A', --, 14B', 14B', and -- saw in side face, and breadth and its open end are aslant estranged from drum section 3A' and 3B'. Therefore, according to this example, drum section 3A' and the effectiveness which can be fabricated the 2nd order are acquired for the receptacle section 23 and the press section 32 of the 1st and 2 holders 21 and 30, without 3B' interfering. In the example shown in (e), as for slot 11A' and 11B', the side cross-section form is formed in an ant form, and the diameter of bore 14A', 14B', and -- is reduced toward the joint. Half-hollow object A' and B' seem therefore, not to dissociate like the example shown in (b), unless half-hollow object A' and the resin injected with secondary shaping consider compression or elongation deformation as B'.

[0019] Combination is possible also for various this examples. For example, it is also combinable with half-hollow object A' shown in (b) of drawing 9 , and half-hollow object B' shown in (e). Combination is variously possible like the following. moreover, there is also shaping equipment 20 as it is about drawing 3 , 4 or drawing 7 , the holders 21 and 30 shown in 8, 21', and 30' -- it is -- some are transformed, it is applicable, and it can be used even if it combines.

[0020]

[Effect of the Invention] As mentioned above, the restoration slot which carried out opening to the joint of the half-hollow object of a pair in primary shaping at the junction edge side according to invention according to claim 1, In the condition of having fabricated two or more free passage holes which were open for free passage into said restoration slot, and having made the joint edge contacting mutually in secondary shaping from the exterior Since melting resin is injected into two or more free passage holes and restoration slots and a hollow object product is obtained (i.e., since two or more free passage holes are also filled up with resin), a hollow object product with the large reinforcement of a joint can be obtained. Therefore, the hollow object product as which comparatively high bonding strength like the tank of for example, the Onaka mold and an intake manifold is required by this invention can be



manufactured. Since according to invention according to claim 2 an exit hole is made to correspond to the free passage hole of one half-hollow object of the half-hollow objects of a pair in secondary shaping and it injects while effectiveness according to claim 1 is acquired, injection pressure can be made low. Since according to invention according to claim 3 the larger heights or the larger protruding line of this free passage hole than a path is fabricated on the outside of a free passage hole when injecting melting resin into two or more free passage holes and restoration slots in addition to the effectiveness that invention according to claim 1 or 2 does so, a hollow object product with still larger bonding strength can be obtained by heights or the protruding line. Shaping equipment according to claim 4 consists of the 1st holder holding one half-hollow object, and the 2nd holder holding the half-hollow object of another side, since these the 1st and 2 holders are constituted so that the joint of a half-hollow object may be held, as compared with the metal mold for the conventional secondary shaping, they are easy structure and it is cheap. And in one [ at least ] holder of these holders, since the resin feed hopper for injecting melting resin is formed and it is in a free passage hole and a restoration slot, although structure is easy and cheap, a hollow object product with large bonding strength can be fabricated. Since the resin feed hopper supports [ according to invention according to claim 5 ] the number and location of a free passage hole in addition to effectiveness according to claim 4 While a hollow object product can be fabricated with low secondary injection pressure, and the effectiveness that invention according to claim 4 or 5 does so is acquired according to invention according to claim 6 Since it becomes depressed in the shape of a bowl, and it corresponds to the number and location of a free passage hole, and the attaching part of the holder of another side also becomes depressed in the shape of a bowl and supports the number and location of a free passage hole, the resin feed hopper which is formed in one holder and is can fabricate heights or a protruding line on the outside of a joint.

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[Translation done.]